Food area

Projects

The Master's degree programme in Department of Food Science

MASTER

THESIS

2018
Table of content

1. New quality perspectives in milk and dairy products: phenolic compounds
2. Alternative colour agents in muscle-based foods
3. Metabolomics to elucidate dietary intake and protein status
4. Flavor compounds in protein stocks
5. Prenatal programming studied by metabolomics in a porcine model
6. Can the liver taste bitter compounds?
7. Effects of phytoestrogens on cytochrome p450 in skeletal muscle
8. Understanding sources of variability of the texture of the yoghurts produced as a function of milk source
9. Molecular changes in muscle structures with consequences for meat quality
10. Use of natural compounds for washing of carrots to prolong shelf-life
11. Hot water treatment to prolong shelf-life of fresh carrots
12. New process technologies in milk powder production - hydrodynamic and acoustic cavitation
13. Formation of ice crystals in cheese samples
14. Milk fat quality and functionality
15. Testing a future vegetable
16. Investigating healthy compounds in green leafy vegetables of white-flowering rapeseed
17. Effect of different UHT technologies on aggregate formation, whey protein denaturation and fat globule modification
18. Influence of different product and sensory profiling methodology factors on the perceived bitterness of beer

19. Sweet product development – taste-taste and crossmodal modulation of the sensory perception of beverages

20. Sweet product development – sensory perception and acceptance of beverages sweetened with alternative sweeteners

21. Acceptance of organic, bitter and healthy vegetables in the public food service sector and among consumers

22. Optimizing the method for measuring the satiating capacity of foods

23. How does a product make you feel? – Sensations experienced after eating

24. Play and Eat

25. Discover the surface/foaming properties of whey protein

26. Protein from alternative source
New quality perspectives in milk and dairy products: phenolic compounds

SHORT PROJECT DESCRIPTION

Phenolic compounds in milk are associated with both health benefits and quality of dairy products. They perform a wide range of metabolic activities: antimicrobial, antioxidant, anti-inflammatory, inhibition of platelet aggregation, and immunological functions, participate in the direct protection of DNA and in the promotion of apoptosis, among other activities.

However, quantitative and qualitative changes in the phenolic compounds in milk and dairy products have not been fully elucidated. Indeed, the potential use of phenolic as functional additives has been embraced by most sectors of the food industry, with the notable exception of the dairy industry.

Therefore, the objective of this project is to establish a method based on liquid chromatography-mass spectrometry to determine the concentration of different phenolic compounds in milk and dairy products to contribute to the understanding of milk composition and potential benefits in dairy products.
Alternative colour agents in muscle-based foods

SHORT PROJECT DESCRIPTION

Our food preferences and choices are determined by both conscious and unconscious factors. Appearance is one of the first and most important attributes that we use to evaluate foods. Consequently, the color of a food item is decisive for how attractive we find a specific food item. For meat products we have a clear expectation that these should have a red or pinkish color dependent on the specific meat product. Often nitrite is used in meat processing to ensure an attractive red/pinkish color. However, a high intake of nitrite may exert harmful effects on human health, and there is therefore an interest in alternative agents for color enhancement of meat products.

This project focuses on elucidating the potential development and use of alternative color agents for muscle-based foods. The project could, for example, involve extraction and characterization of blood-derived proteins (haemoglobin) as color agents.

PHYSICAL LOCATION OF THE PROJECT
AU-Aarslev, Kirstinebjergvej 10, DK-5792 Aarslev

PROJECT START
Any time

EXTENT AND TYPE OF PROJECT
45-60 ECTS

MAIN SUBJECT AREA
Meat and colour

ADDITIONAL INFORMATION

MAIN SUPERVISOR
Professor Hanne C. Bertram
Department of Food Science
Aarhus University
E-mail: hannel.bertram@food.au.dk
Phone: +45 87158353
Homepage: http://food.au.dk/
Metabolomics to elucidate dietary intake and protein status

SHORT PROJECT DESCRIPTION

Aging is associated with a decline in muscle mass and strength, which is known as sarcopenia. Sarcopenia does not only impact mobility but also metabolic health. Elderly may have a low dietary protein intake, which can result in loss of muscle mass in the body and augment sarcopenia. It is therefore important to ensure a sufficient protein intake in elderly to ensure a good protein balance. Commonly 24-h questionnaires are used to assess dietary intake.

However, it is well known that the method is associated with some uncertainties and errors caused by incorrect reporting, either consciously or unconsciously. Thus, there is an interest in developing more objective and quantitative measures of food intake. Metabolomics is an explorative approach that aims at covering multiple metabolites rather than few, selected metabolites and thereby provide a more comprehensive fingerprint of the metabolic state of an individual. The fact that metabolomics has the ability to characterize a wide range of metabolites simultaneously means that it is a useful tool for elucidating metabolic response to food intake.

However, only few studies have elucidated the use of metabolomics for dietary assessment in free-living people. In this project focus will be on elucidating the potential of urine metabolomics for validation of 4-day food intake registration of elderly that are enrolled in an intervention study with dietary protein and exercise.

MAIN SUPERVISOR

Professor Hanne C. Bertram
Department of Food Science
Aarhus University
E-mail: hannec.bertram@food.au.dk
Phone: +45 87158353
Homepage: http://food.au.dk/

PHYSICAL LOCATION OF THE PROJECT
AU-Aarslev, Kirstinebjergvej 10, DK-5792 Aarslev

PROJECT START
Any time

EXTENT AND TYPE OF PROJECT
45 or 60 ECTS master thesis project

MAIN SUBJECT AREA
Nutrition and metabolomics

ADDITIONAL INFORMATION
Flavor compounds in protein stocks

SHORT PROJECT DESCRIPTION

Protein stocks prepared from heat treatment of muscle-based raw materials are used for flavor enhancement in food industry, for example in soups and bouillons.

Amino acids, peptides and nucleotides are some of the major compounds that contribute to a unique flavor of these protein stocks. Glutamic acid is for example known for its contribution to umami taste. Recently another basic taste, kukomi, has started to obtain considerable attention. Kukomi provides an attractive mouthfeel and is ascribed to specific tripeptides including glutathione.

In this project it will be investigated how raw material, enzymatic treatment and processing parameters influences the generation of important flavor compounds and how this may be used strategically to mask undesired taste from bitter compounds. The analyses will be based on a combination of nuclear magnetic resonance (NMR) spectroscopy and liquid chromatography mass spectrometry (LC-MS).
SHORT PROJECT DESCRIPTION

We inherit more than genes from our parents. It is well established that decreased growth during fetal development, leading to intrauterine growth restriction (IUGR) and consequently low birth weight, has crucial influence on health later in life.

Thus, poor fetal growth increases the risk of developing metabolic disorder, like type 2 diabetes, coronary heart disease, elevated blood pressure, and obesity, in adult life. Such effects have been shown in animal models of IUGR. The term fetal metabolic programming is generally accepted to describe the phenomenon of the long-term effects of a stimulus or insult during fetal development. Nevertheless, even though the impact of fetal metabolic programming on adult health is well documented, the underlying mechanisms are poorly understood. Metabolomics, which enable to profile numerous metabolites and thereby portray metabolic status, may provide insight into biochemical pathways that are altered during IUGR.

In the present study, metabolomics will be applied on samples collected from a pig-based model of IUGR. The objective is to identify possible mechanisms during fetal development that can couple metabolism during fetal life with later development of the metabolic disorders.
Can the liver taste bitter compounds?

**SHORT PROJECT DESCRIPTION**

Hepatic detoxification is conducted by a series of enzymatic reaction and results in the elimination of drugs and toxic compounds from the body. The rate limiting step in this process is the reaction carried out by the cytochrome p450 enzymes (CYP). The expression of the CYPs are highly adaptive and controlled by a network of transcription factors. Central in this network is the aryl hydrocarbon receptor (AhR) controlling the expression of the major CYP sub-family CYP1A.

Taste is divided into five basic categories, sensed by taste-specific receptors. Bitter taste is perceived by the TAS2 receptor family and is considered a warning signal of toxic compounds. Interestingly TAS2 receptors is expressed in extra oral tissue, including the liver and intestine. The function here is only vague elucidated and I could be speculated that the perception of bitter tastes here is linked to the detoxification process.

Preliminary data from our lab shows that activation of the AhR by TCDD upregulates the mRNA expression of TAS2R in porcine primary hepatocytes.

This project will investigate at the molecular level, the tissue distribution of TAS2R in pigs and the impact of AhR activation on TAS2R regulation in hepatocytes. The project includes culturing of primary liver cells, analysis of gene (qPCR) and protein expression (e.g. western blotting).
Effects of phytoestrogens on cytochrome p450 in skeletal muscle

SHORT PROJECT DESCRIPTION

The female sex hormone, estradiol, is found naturally in the body, while ethinyl estradiol is the synthetic counterpart found in oral contraceptives. Estradiol has been shown – like testosterone – to have anabolic effects on skeletal muscles. Estradiol is synthesized from testosterone by the p450 enzyme system in the liver, which also plays an important part in metabolising both estradiol and ethinyl estradiol into inactive metabolites. Muscle-specific p450 enzymes exist, which suggest that skeletal muscle can metabolize the female hormones and may also support the notion of a direct effect of estradiol in skeletal muscle.

Preliminary results from our lab suggest that both estradiol and ethinyl estradiol can regulate cytochrome p450 expression in muscle cells, which may cause its own metabolism to be accelerated. At present, it is unknown if this is also the case for phytoestrogens.

Using an existing skeletal muscle stem cell model growing satellite cells in culture, this project will investigate regulation of p450 in skeletal muscle in the presence of phytoestrogens. The project will include experimental techniques like RT-PCR and western blotting, as well as cell culturing.

PHYSICAL LOCATION OF THE PROJECT
AU-Foulum, Blichers Allé 20, DK-8830 Tjele

PROJECT START
Any time

EXTENT AND TYPE OF PROJECT
45 or 60 ECTS M.Sc. project including practical laboratory work, 11 months

MAIN SUBJECT AREA
Molecular nutrition and cell biology

ADDITIONAL INFORMATION
Assistant professor Martin Krøyer Rasmussen, AU-FOOD and post doc Line B. Dalgaard, Section for Sports Science will be co-supervising. This is a joint project between AU-Food and Section for sports science, so project work can be done at both places.

MAIN SUPERVISOR
Senior Scientist Jette Feveile Young
Department of Food Science
Aarhus University
E-mail: jettef.young@food.au.dk
Phone: +45 87158051/23478883
Homepage: http://food.au.dk/
Understanding sources of variability of the texture of the yoghurts produced as a function of milk source

**SHORT PROJECT DESCRIPTION**

The research questions of the project is around whether day to day variability of yoghurt texture be correlated to the milk source in terms of cow related primary factors, it could be genotype, cow feed, season, somatic cells or lactation stage. What is minimum (i.e. unavoidable) day to day variability in yoghurt texture? Can the identified relevant parameters be measured routinely, and can the yoghurt texture be predicted (if the identified relevant parameters are known)? The objectives are to identify sources of variability and their relative importance, to provide leads on possible markers and to evaluate the maximum tolerable day to day variability in yoghurt texture if milk quality is held under control (for Chr. Hansen ATC yoghurt productions).

The approach involves:
1. Review literature, processes and raw materials and compile an extensive list of factors influencing the final variability of the yoghurt texture.
2. Use a yoghurt model study set up initially to test effect of selected variability in milk on yoghurt properties.
3. Set up a model yoghurt production (raw materials, model culture, process, etc) and estimate (“measure”) day to day variability using milk powders to reduce variation stemming from raw materials.
4. Produce a number of yoghurt samples from selected experimental milks originating from selected raw milk variabilities. Analyze the results to identify the relevant parameters.
5. Test the hypothesis / validate the model on an unknown sample.
**SHORT PROJECT DESCRIPTION**

The wooden breast phenomenon is an abnormality of the large breast muscle affecting meat quality. The development of wooden breast has been registered already 2 weeks prior to slaughter.

The aim of this project is to follow the development of wooden breast from the chickens are small until the time of slaughter and try to identify biomarkers which at an early stage can indicate if wooden breast is developing. Chickens are reared in houses where the CO2 level is followed in order to investigate a possible impact of the environment on wooden breast development.

The project include gene and protein regulation analysis (real time PCR and western blotting, respectively).
Use of natural compounds for washing of carrots to prolong shelf-life

SHORT PROJECT DESCRIPTION

High consumer awareness has led to search for technologies that do not involve chemicals and can be considered natural. Use of natural active compounds from plants and herbs gained recently a lot of attention, due to their antimicrobial, antifungal and antioxidant properties. The aim of the study is to test natural active compounds (e.g. essential oil from thyme or oregano) as sanitizers during washing process and their impact on produce quality and sensory. The quality of carrots is mainly determined by presence of the fungus Thiaveliopsis basicola and the bacteria Erwinia carotovora. The research project involves development of the washing protocol and evaluation of the impact of different treatments on product quality determined by physical, chemical, microbiological analyses, and sensory panel. The project involves in vitro lab tests and in vivo experiments on fresh produce to study treatment efficiency. The MSc project is part of the research project ‘KvaliRod’ funded by the Green Development and Demonstration Program. ‘KvaliRod’ is carried out in collaboration with several Danish companies. You will be part of our project group and will interact with our partners. The MSc project can be developed in different directions depending of the interest and background of the student.

Short project description

Hot water treatment (HWT) has recently gained attention as an eco-friendly technology to reduce food waste; however, there are few studies on the technology. The objective of the research project is to develop a method for HWT of carrots to reduce spoilage of packaged fresh produce in the supply chain caused by the fungus Thieveliopsis basicola and the bacteria Erwinia carotovora. The research project involves development of the HWT technology (temperature and time) and studies of the impact of different treatments on product quality determined by physical analyses (microscopy, electrolyte leakage), chemical analyses (volatiles, polyacetylenes, sugars), and sensory analysis by expert evaluation. The project also involves artificial inoculation of carrots before HWT to study treatment efficiency. The MSc project is part of the research project ‘KvaliRod’ funded by the Green Development and Demonstration Program. ‘KvaliRod’ is carried out in collaboration with several Danish companies. You will be part of our project group and will interact with our partners. The MSc project can be developed in different directions depending on the interest and background of the student.

New process technologies in milk powder production - hydrodynamic and acoustic cavitation

**SHORT PROJECT DESCRIPTION**

The project will cover the application of cavitation-based technologies in relation to powder production. Cavitation is the sudden formation and collapse of low-pressure bubbles in liquid with the release of an energy wave. Uncontrolled, cavitation can be very destructive to process, but using high intensity ultrasound or hydrodynamic cavitation the destructive force can be controlled and used. There is a potential for use of such technologies as pre-treatment in milk powder production as cavitation events can reduce the viscosity of concentrated milk.

During milk powder production, water is removed by evaporation prior to spray drying. Spray drying at higher solids concentration improves drying efficiency, and reduces the overall energy cost. As the performance of the evaporator prior to spray is limited by viscosity, it is beneficial to reduce feed viscosity. Thus, cavitation-based technology could potential be used as a pre-treatment in milk powder productions.

A master thesis project could cover areas such as evaluating the reduction in viscosity, powder quality or microstructure/functionally of yoghurt produced from cavitation treated powders. It is possible to discuss master project ideas in relation to these areas and eventually formulate a specific project within this area based on interest. There are opportunities for participating in pilot plant experiments at the SPX Flow Technology innovation center.
Formation of ice crystals in cheese samples

**SHORT PROJECT DESCRIPTION**

In order to extend shelf life dairy products, we aim at transporting products as cold as possible. In a specific project we are looking at transporting products at a supercooling temperature, meaning temperatures below 0°C without freezing the products. The benefit of storing products below 0°C is that microbial growth, microbial spoilage and enzymatic degradation is reduced significantly, thereby prolonging the shelf life of the products. However, cooling below 0°C is a major challenge from a microstructural and quality point of view. Formation of ice crystals is detrimental for product microstructure and integrity, thus causing product quality to be compromised. We aim to find the lowest supercooling temperature at which no ice crystals are formed. In other words, we aim at finding the freezing point of specific products. Currently, focus is on different kind of cheeses and we have already looked into several ways of analyzing products to find the freezing point. Techniques include differential scanning calorimetry (DSC) and analyzing freezing curves for products stored at different temperatures. Furthermore, macro- and microstructural changes have been investigated using different imaging techniques. We can have an investigation if other methods (e.g. NMR) might be applicable as well. In this current project we aim to find the effect of the both the freezing rate as well as the water distribution in the food matrix on the ice crystal formation. The products that are incorporated in the research are: yellow cheeses, cream cheeses, white cheeses, white mould cheeses and cream.
Milk fat quality and functionality

PHYSICAL LOCATION OF THE PROJECT
AU-Foulum Blichers Allé 20, DK-8830
Tjele

PROJECT START
2018

EXTENT AND TYPE OF PROJECT
45 or 60 ECTS master thesis project

MAIN SUBJECT AREA
Dairy chemistry

SHORT PROJECT DESCRIPTION

Already in the feeding and management of the dairy cow the quality of the milk fat is affected. Increasing the milk frequency to 3 times per day increase the milk yield, however several studies have also showed that the concentration of free fatty acids in milk increase. Elevated levels of FFA can result in rancid flavours in dairy products. The mechanism behind the effect of milking frequency is rather unknown. From a farm study, we have collected milk from individual cows, which has been milked both 2x and 3x. In the project, the composition of the milk fat and milk fat globule membrane can be analysed.

Feeding the dairy cow with only grass-based feedstuff provide economically and environmental benefits and additionally create a “healthier” milk composition. The research project “Grass milk” receive milk from herds using such a grass concept. A thesis project can be associated to the project, and deal with quality and functionally of milk, which could include fat crystallisation and foaming properties (e.g. for Cafe Latté).

It is possible to discuss master project ideas in relation to these research projects and formulate a specific project within this area based on interest.
Testing a future vegetable

SHORT PROJECT DESCRIPTION

Through traditional breeding, crossing of rapini (Brassica rapa) and a rapeseed (Brassica napus) with white flowers has resulted in the new vegetable colzácoli. The student work will contribute to the testing of the vegetable leading to the final product.

We expect the vegetable to have a distinct taste and a unique profile of secondary metabolites, which is linked to human health.

In the project, you will have the possibility to analyze for plant content of glucosinolates, carotenoids or polyphenols. Depending on when the project starts, an evaluation of the sensory properties (taste) or a shelf life experiment can be carried out as well.

Furthermore, the project gives you the possibility to get insight into a small breeding company and its’ work.

ADDITIONAL INFORMATION

Project supervisor: Marie Grønbæk (Industrial postdoc), gronbaek@food.au.dk, +45 8715 8327. The master project will be linked to an industrial postdoc project where we are testing a newly bred vegetable, which is not yet on the market. It’s the breeding company Knold & Top who made the new vegetable.

MAIN SUPERVISOR

Associate Professor Hanne Lakkenborg Kristensen
Department of Food Science
Aarhus University
E-mail: hanne.kristensen@food.au.dk
Phone: +45 8715854
Homepage: http://food.au.dk/
Investigating healthy compounds in green leafy vegetables of white-flowering rapeseed

SHORT PROJECT DESCRIPTION

All Brassica crops such as cabbages contain the potential health-beneficial secondary metabolite glucosinolate, which is furthermore related to the taste of the plant. They also contain other secondary metabolites of relevance to human health such as carotenoids and polyphenols.

The content of secondary metabolites can be modified through growing conditions of the crop e.g. fertilization levels, plant developmental stage at harvest, and temperature, thereby resulting in potentially healthier vegetables.

With this starting point, you have the possibility of collecting data defined by your interests, from a field experiment running in the project. You will learn the basic principles of setting up an experiment, analyze the plant content of a secondary metabolite besides data analysis.

Furthermore, the project gives you the possibility to get insight into a small breeding company and its work.

The master project will be linked to an industrial postdoc project working on new products of green leafy vegetables (salad) developed from white-flowering rapeseed (Brassica napus) together with the breeding company Knold & Top ApS (www.colza.dk). The company uses the scientific results in their business selling seeds.

PHYSICAL LOCATION OF THE PROJECT
AU-Aarslev, Kirstinebjergvej 10, DK-5792 Aarslev

PROJECT START
Any time but could be timed with the experiment running in the project

EXTENT AND TYPE OF PROJECT
45 or 60 ECTS projects based on experimental work performed by the student besides data analysis of original data

MAIN SUBJECT AREA
Horticulture, growing conditions, food chemistry, plant physiology, secondary metabolites, glucosinolates, carotenoids, polyphenols, Brassica

ADDITIONAL INFORMATION
Project supervisor: Marie Grønbæk (industrial postdoc), gronbaek@food.au.dk, +45 8715 8327. http://pure.au.dk/portal/da/gronbaek@food.au.dk.

MAIN SUPERVISOR
Associate Professor Hanne Løkenborg Kristensen
Department of Food Science
Aarhus University
E-mail: hanne.kristensen@food.au.dk
Phone: +45 8715 8354
Homepage: http://food.au.dk/
Effect of different UHT technologies on aggregate formation, whey protein denaturation and fat globule modification

SHORT PROJECT DESCRIPTION

The two major UHT technologies used in the dairy industry, indirect and direct heat transfer, differ regarding heating rates and mechanical forces. The fast heating rates in direct UHT processes result in a different whey protein denaturation and aggregation behavior compared to indirect processes which could have functional implications for certain dairy products. On the other side, introducing steam into a liquid product and the vacuum cooling step lead to mechanical stress of the product resulting in increased protein aggregation. The aim of this project is to characterize the aggregate formation of both whey proteins and caseins and to investigate the impact of mechanical stress on protein and fat stability.

Milk will be heat treated at Arla’s pilot UHT plant using steam infusion, steam injection and indirect heating technologies. The heat treatment will be matched to achieve the same heat load on the milk. Optionally pre heat treatment can be varied to achieve different levels of whey protein denaturation and aggregates.

Aggregates will be characterized by particle size measurement and size exclusion chromatography. The nature and composition of the aggregates will be analysed by LC-MS. Fat globule damage and modification will be assessed by particle size measurement and can be supplemented by confocal microscopy.

PHYSICAL LOCATION OF THE PROJECT
AU-Foulum Blichers Allé 20, DK-8830 Tjele and Arla Foods Innovation Centre, Skejby

PROJECT START
August 2018

EXTENT AND TYPE OF PROJECT
45 or 60 ECTS master thesis project

MAIN SUBJECT AREA
Processing and protein chemistry

ADDITIONAL INFORMATION
The project is a collaborative project between industry and university. The processing and main part of the analytical work is going to be carried out at Arla Foods amba in Skejby, but some of the analytical work may be carried out at Department of Food Science in the laboratories in Foulum, depending on detailed discussions and results during the project period.

MAIN SUPERVISOR
Professor Lotte Bach Larsen
Department of Food Science
Aarhus University
E-mail: lbl@food.au.dk
Phone: +45 87158049
Homepage: http://food.au.dk/
Influence of different product and sensory profiling methodology factors on the perceived bitterness of beer

**SHORT PROJECT DESCRIPTION**

Beer is an intriguing product, because it is complex and has a wide range of controllable and very specific sensory characteristics depending on its source and brewing basis. Furthermore, some of the flavour and taste components in beer, especially bitterness, are still not identified.

The MSc project will study how different product factors (type of beer; barley, yeast, hops) and sensory profiling methodology factors (type and length of scale, sample presentation and training of panel) influence the perceived bitterness of beers.

The MSc project will be part of a larger project called DNA-shapes (full title: Analysis of Complex Biological Mixtures by A Novel Method: “DNA-Shapes” – A Model for Artificial Taste).

The aim of the project is to endeavour to mimic and potentially gain a more comprehensive understanding of human taste perception by linking DNA-segmentation profiles to ultra-sensitive sensory profiles of complex food mixtures. This requires very sensitive sensory profiling methods in able to measure perception on a molecular level. Therefore, a part of the DNA-shapes project investigates how to optimize key factors in two areas (product and methodology) involved in sensory profiling.
Sweet product development – taste-taste and crossmodal modulation of the sensory perception of beverages

SHORT PROJECT DESCRIPTION

The sugar intake especially from beverages is too high among specific segments, e.g. adolescents. The beverage industry has mainly focused on reducing sugar content per se with limited success due to drastic alteration in the sensory profile that are disliked by many.

The goal of the project Innosweet is to apply an integrated scientific-based sensory perceptional-, psychological-, and physiological (PPP) approach to sugar-reduced or -replaced (SRR) beverages enabling lowering the sugar content whilst maintaining unaltered sweetness perception.

You will as a master thesis student in the Innosweet project work on product development of beverages with lower sugar contents but unaltered sweetness perception from a sensory and consumer science perspective. This is going to be done and tested using taste-taste interaction and crossmodal interactions such as flavor-taste and texture taste interactions. The thesis will include sensory descriptive analysis and consumer studies and you will be part of planning, executing and analyzing data from the studies.

What is crossmodal perception?
How information from the different sensory modalities such as sight, sound, touch, smell, and taste, may be integrated by the nervous system and perceived by us. Of importance in this thesis is how different sensory modalities interact with one another and alter each other’s processing.
Sweet product development – sensory perception and acceptance of beverages sweetened with alternative

SHORT PROJECT DESCRIPTION

The sugar intake especially from beverages is too high among specific segments, e.g. adolescents. The beverage industry has mainly focused on reducing sugar content per se with limited success due to drastic alteration in the sensory profile that are disliked by many.

One of the goals of the project Innosweet is to test the sensory perception and acceptance of beverages where alternative sweeteners have replaced sugar.

You will as a master thesis student in the Innosweet project work on product development of beverages with alternative sweeteners but unaltered sweetness perception from a sensory and consumer science perspective.

The thesis will include sensory descriptive analysis and consumer studies and you will be part of planning, executing and analyzing data from the studies.
Acceptance of organic, bitter and healthy vegetables in the public food service sector and among consumers

SHORT PROJECT DESCRIPTION

The goal of many public kitchens is to increase the ratio of organic food in their production of meals.

Vegetables, including cabbage and root vegetables, are important ingredients in organic meals.

The student will focus on bitter-tasting vegetables, their applicability and preparation of these vegetable as well as acceptance of these vegetables in a hospital kitchen and vegetable delivery to Årstiderne’s consumers, respectively.

PHYSICAL LOCATION OF THE PROJECT
AU-Aarslev, Kirstinebjergvej 10, DK-5792 Aarslev

PROJECT START
Any time

EXTENT AND TYPE OF PROJECT
45 or 60 ECTS master thesis project

MAIN SUBJECT AREA
Sensory and consumer analysis

ADDITIONAL INFORMATION
Co-supervisor Post Doc Line Holler Mielby, LineH.Mielby@agrsci.dk

MAIN SUPERVISOR
Associate Professor Ulla Kidmose
Department of Food Science
Aarhus University
E-mail: ulla.kidmose@food.au.dk
Phone: +45 87158293
Homepage: http://food.au.dk/
Optimizing the method for measuring the satiating capacity of foods

SHORT PROJECT DESCRIPTION

Designing food and beverages that make consumers feel full faster and for longer are one of the top priorities in Danish food industry R&D. Despite the high relevance of optimizing the method to measure the satiating capacity of foods, little work is done in this field.

In this MSc project you will be connected to the OmniSaM project (Omnibus Satiety Metric) which explores satiety from a behavioural, fMRI and endocrine and perspective.

You will work with the method to measure the satiating capacity of foods and its optimization, more specifically; you will test the effectiveness of the method when changing the context of study conductance; natural setting compared to laboratory setting compared to clinical setting.

Ingredients to create beverages with different satiating capacity will be delivered by Arla Foods Ingredients and Arla Foods Amba.
How does a product make you feel?  
- Sensations experienced after eating

SHORT PROJECT DESCRIPTION

There is an increased focus on healthy products in the food industry and food cultural trends. Researchers and product developers are used to asking consumers why a product is liked, and how much it can contain regarding nutritional content etc. In recent years, this has been supplemented with questions regarding how a product makes you feel, with a shift from a biological perspective to a more holistic and wellbeing perspective.

An area that needs to be addressed more extensively is the sensations experienced as a consequence of eating. In this MSc you will study dynamics in mental- (e.g. desires, motivations and satisfaction) and physical (e.g. stomach rumbling, energy) sensations experienced after intake of meals and products, e.g. with different protein content or other model foods. These sensations are especially relevant for the overall appreciation of the food, for food choice, and for repeated purchase.

MAIN SUPERVISOR

Professor Derek Victor Byrne  
Department of Food Science  
Aarhus University  
E-mail: derekv.byrne@food.au.dk  
Phone: +45 87158394  
Homepage: http://food.au.dk/
Play and Eat

SHORT PROJECT DESCRIPTION

Food and meals in schools and day cares are not only about securing availability of healthy foods but requires that the context in which the food is eaten supports that children can eat and enjoy their food.

At this point, information about the meal setting in schools is limited. In this project the focus is at how the setting can be optimized to facilitate and support healthy eating.

The student will explore factors of importance for facilitating healthy and joyful eating and investigate the effect of changing meal settings on intake, preferences and the eating experience.
Discover the surface/foaming properties of whey protein

**SHORT PROJECT DESCRIPTION**

**Background:**
A variety of different whey protein products are produced by Arla Foods Ingredients (AFI). Our ingredients are sold for pediatric, sport nutrition, medical nutrition, health foods, dairy and bakery.
Our mission is “We are here to discover and deliver all the wonders whey can bring to people’s lives”.
AFI assisting the food industry to develop and efficiently process more natural, functional and sustainable foods.
To achieve this, it would be interesting for AFI to gain more knowledge about the surface properties of whey proteins. Especially foam ability, but emulsifying ability could also be interesting.
To replace other emulsifier and stabilizer to achieve more natural foods.

**Aim:**
The aim is to achieve more knowledge about the surface properties of whey proteins.
The ability of the whey proteins to lower surface tension and form film / interface (interface rheology).
Knowledge of how whey proteins effect foam structure and foam stability, and effect of salts /minerals, lactose, pH and ionic strength on the foam ability of the whey proteins.
Additionally, it might be interesting to initiate new analyzes in this area.
SHORT PROJECT DESCRIPTION

The project will focus on extraction of protein from alternative sources e.g. seaweed, lucerne or clover (it can be discussed which species to focus on).

Different extraction, precipitation and pre-treatments will be investigated in relation to protein yield and quality. In plants and seaweed, the redox enzyme polyphenol oxidase can disturb both yield and quality of protein and therefore inhibition of this particular enzyme will be investigated.

The polyphenol oxidase oxidizes the secondary metabolites called polyphenols resulting in crosslinkages between them and the protein may affect the bioavailability of the extracted protein. Polyphenol are therefore considered as antinutritional factors (ANFs) and the investigation of these can be a focus as well.

Thus, protein chemistry and evaluation of secondary metabolites are investigated in the project.